MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019 / 2020

PPS 0335 – PROBLEM SOLVING AND PROGRAMMING

(Foundation in Information Technology)

12 OCTOBER 2019
2.30pm – 4.30pm
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 4 pages (excluding the cover page) with 5 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

QUESTION 1 [10 Marks]

a. Explain and give **TWO (2)** examples of problems for each of the following problem types.
   i. Algorithmic solutions
   ii. Heuristic solutions

(4 marks)

b. Listed below in the left column of **Table 1** is some terms associated with problem-solving concepts for the computer. Match the following terms to their examples in the right column by writing the term in the blanks provided. An example is shown below.

Table 1

Terms	Examples of problem-solving concepts for the computer
string	i. ***data type*** real, integer, logical
variable	ii. _____ a = x + y, balance = total - spent
data type	iii. _____ total, name, balance
equation	iv. _____ "1234", "Smith", "01/01/2019"
expression	v. _____ 3.45, -99.0, 0.0045
whole number	vi. _____ x + y, a > b, age >= 18
real number	vii. _____ 45, 23, 99

(3 marks)

c. Define the following terms used in programming.
   i. Compiling
   ii. Debugging

(2 marks)

d. What is the output of the following pseudocode?

```
start:
    x = 10, y = 12
    print x '\n' y
end:
```

(1 mark)

Continued ...

QUESTION 2 [10 Marks]

a. What are the results of the following operations?

	Operation	Result
i.	4 + 2 – 3	
ii.	4 + 9 * 3	
iii.	10/2 * 6.0	
iv.	8 + 10 MOD 4	
v.	5 < > 5	
vi.	NOT (True OR False)	

(3 marks)

b. Write computer equations for following problems.
   i. A shop increases the cost of a pair of shoes from RM12 to RM48. What is the percentage increase?

   ii. Mariam has some 60 pieces of RM5 notes and 100 pieces of RM10 notes in her wallet. She uses half of the number of RM5 notes and receives another twelve of RM10 notes from her mother. How much money does she have now?

   iii. Suppose a car has initial value of RM155,000 and depreciates RM10,000 per year. What is the value of the car after 10 years?

   iv. You invested RM10,000 in each of two accounts, one paying 8% and the other account paying 10% annual interest. Find the difference interest earned at the end of the year.

(4 marks)

c. Setup a logical expression for the following conditions.
   i. To pass the subject a student must score at least 50 marks.
   ii. To donate blood a person must be within the age of 18 to 60 years and have body weight of at least 45 kg.
   iii. To pay income tax a person must earn more than RM34,000 per annum after EPF deductions.

(3 marks)

QUESTION 3 [10 Marks]

a. You get a part-time job at a fast-food restaurant. Let say you are paid RM4.00 per hour and work 40 hours per week. Write an algorithm to determine your monthly gross income. Define all numeric values as constant values.

(2 marks)

Continued ...

b. Given the cost price and selling price of a product. Develop an input-processing-output (IPO) chart to calculate the profit or loss. Define all data required as input values.

Examples:
Input: cost_price = 1500, selling_price = 2000
Output: 500 Profit

Input: cost_price = 3125, selling_price = 1125
Output: 2000 Loss

(3 marks)

c. Kishan monthly salary is RM 6,000. He spends 20% of his salary on rent. The remaining amount, he spends 25% on the education of his children and 20% on food. Develop a problem analysis chart (PAC) to find Kishan's monthly expenditure and monthly savings. You may define all numeric values as constant values.

(5 marks)

QUESTION 4 [10 Marks]

a. You use the food delivery service to buy 1 large Cream Puff and 1 Red Velvet which costs RM7.00 and RM13.00 respectively. The delivery charge is RM4.00 and the service fee is 15% from the amount bought. Write a pseudocode to calculate and print the total amount you have to pay for the service. Define all numeric values as constant values.

(2 marks)

b. **Table 2** shows the boat rental rates of Persona Island Boat Rentals. Write an algorithm to ask for week type and hour, then calculate and print the rental cost.

Table 2

Boat Rental Rates Grand Island Boat Rentals		
	Hourly rate	**4+ Hourly rate**
Weekday	45	40
Weekend	55	50

(4 marks)

c. **Table 3** shows the 2019 Membership Fees for the YMCA club. Write an algorithm to ask for the age and calculate and print the total fee. Use negative-logic structure for the decision control statements.

Table 3

2019 Membership Fees		
Age	**Join Fee**	**Annual Fee**
0 – 12	10	144
13 – 17	15	240
18 – 64	60	492
65 or above	50	432

(4 marks)

Continued ...

QUESTION 5 [10 Marks]

a. Develop a flowchart to print the following number series of 7, 14, 21, ... and 84. Create a variable, ***X***, to assign the first value to start a loop. Use automatic-counter loop for the repetition control statements.

(2 marks)

b. The following algorithm is to calculate total tuition fee of a university. Convert it to a flowchart.

1. *start*
2. *counter = 0, totalfee = 0*
3. *read totalsubject*
4. *repeat*
   read credithour
   *totalfee = totalfee + (credithour * 300)*
   counter = counter + 1
   until (counter = = totalsubject)
5. *end*

(3 marks)

c. Assume that you want to do a game development for your final year project. One of the modules in the game development is to display a menu with the following options:

S – start the game
P – pause the game
R – restart the game
X – exit

- Develop a flowchart for the above module that allows the user to choose one of four options to play the game.
- It should repeat displaying the menu until the user selects ***X*** to exit.
- Use while-loop for the repetition control statements.
- Use if...elseif...else statement for the decision control statements.
- The user will enter only one char for the option.
- If the user enters an invalid option, print "Try again!"
- If the user enters 'S', print "Starts!"
- If the user enters 'P', print "Paused!"
- If the user enters 'R', print "Restarts!"

(5 marks)

End of Paper